Spectrodensinometer

Thank you for purchasing a Spectrodensinometer from Ascott. Please read these instructions carefully and retain for future reference.

Important Information

This equipment should only be used as intended by suitably qualified and trained personnel.

These instructions should be always readily available to such personnel.

Normal common-sense safety precautions must be taken at all times to avoid the possibility of accidents.
We recommend that users produce their own risk assessment for the entire testing process for which this equipment will be used.

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1 Power On & Off

Turn the power switch to "I", the instrument is powered up, and the indicator light is always green. Turn the power switch to "O", the instrument is off and the indicator is off.

If the instrument is not power on after switched to "I", the battery may need to be charged. When the instrument is on for a long time without any operation, the instrument will automatically enter the standby state. At this time, press the measurement button to wake up the instrument into the working state (refer to chapter Setting ->screen backlight time section). When the instrument is started, jump from the LOGO interface to the main menu or the black and white calibration interface

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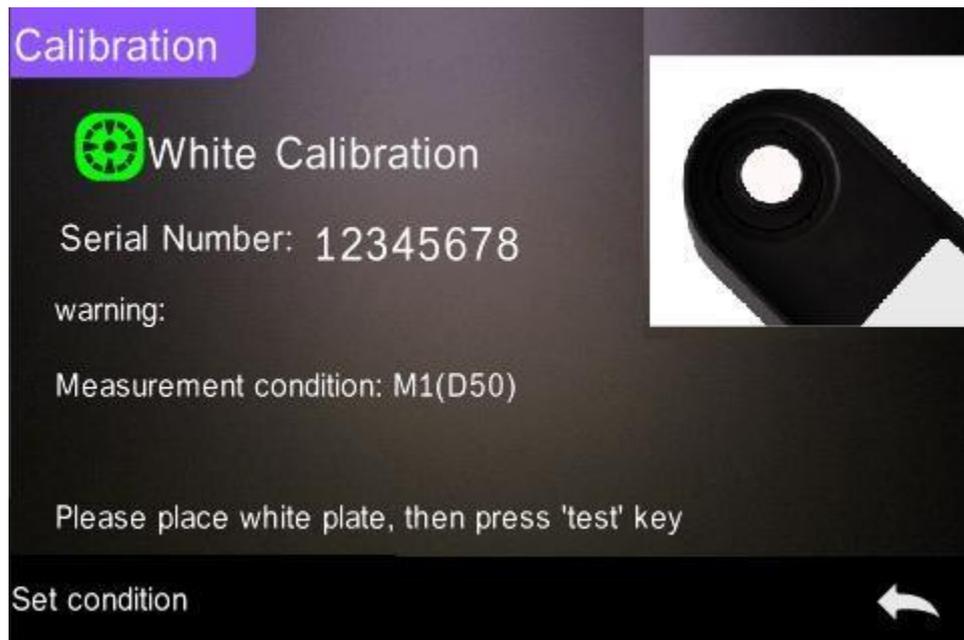Corrosion Test Chambers

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Figure 2 White and Black Calibration

Note: If the instrument is not in use for a long time, please cut off the power of the instrument.

2 Connecting to PC

2.1 USB Connection

USB steps to use the spectrodensitometer:

1. If the PC software has not been installed, please install it immediately,

2. Insert the square end of the USB cable into the instrument,

3. Plug the other end of the USB cable into the available interface on the PC,

4. If the connection is successful, the status bar of the instrument will display USB icon andit is able to manage the instrument by PC software. Otherwise, you need to find the problem.

Note: for Windows, it should install the software driver before connecting the instrument to the computer.

2.2 Bluetooth Connection

Some of the Bluetooth devices communicate wirelessly with computers.

Many Windows PCs have built in Bluetooth capability. If this is the case with your computer you may use the built-in hardware. If not, you will need to purchase a Bluetooth device that plugs into your USB port before continuing.

Steps to use Bluetooth for Spectrodensitometer:

1. Turn on the "System Settings → Bluetooth" function;

2. Turn on Bluetooth function on the PC and search for the device, for example:3nh-ble-device-01;

3. Fill in the matching code to connect;

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4. If the connection is successful, the status bar of the instrument will display the Bluetooth connection icon " " and it is able to manage the instrument by PC software. Otherwise, you need to find the problem.

Figure 3 The Bluetooth icon is displayed in the status bar

3 User Interface

This instrument contains a graphical touch screen display, all functions are directly entered through the screen.

3.1   Enter basic mode

The basic mode has two quick menu screens, density /TVI and CIE L*a*b*. Tap the icon to open the appropriate tool on the on-screen menu.

Figure 4 Basic Mode

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Tap the "density /TVI" icon to enter the interface of density /TVI. Tap the "main menu" in the lower right corner of the icon to jump back to the interface of the main menu. Tap the "Settings" in the lower left corner and the screen jumps to the corresponding

settings interface.

Figure 5 Density /TVI interface

Note: the density /TVI interface settings include: measurement conditions, density states, density reference white, density accuracy, tone values, and tone value increase. The CIE L*a*b* interface is set up differently, including measurement conditions, light source and observer angle.

3.2 Enter advanced mode

Advanced mode has two quick menu screens, densitometer and basic comparison.

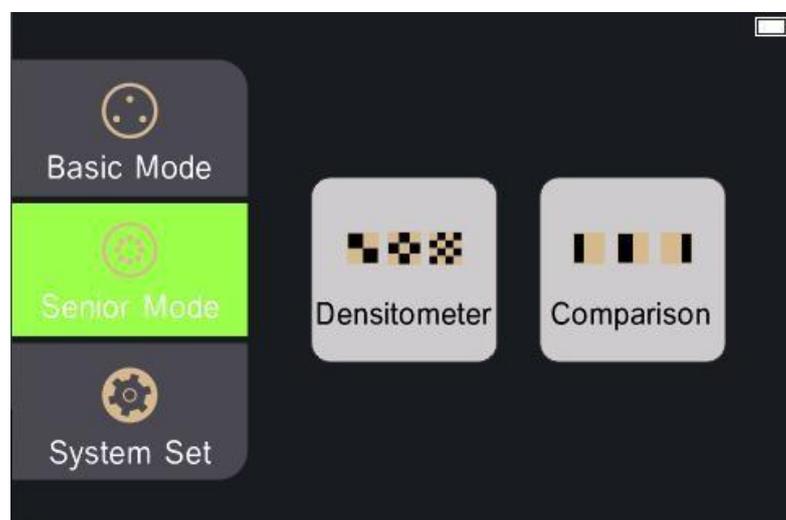Tap the icon to open the appropriate tool on the menu.

Figure 5 Advanced Mode

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Tap the "density /TVI" icon to enter the interface of density /TVI. Tap the "main menu" in the lower right corner of the icon to jump back to the interface of the main menu. Tap the "Settings" in the lower left corner and the screen jumps to the corresponding
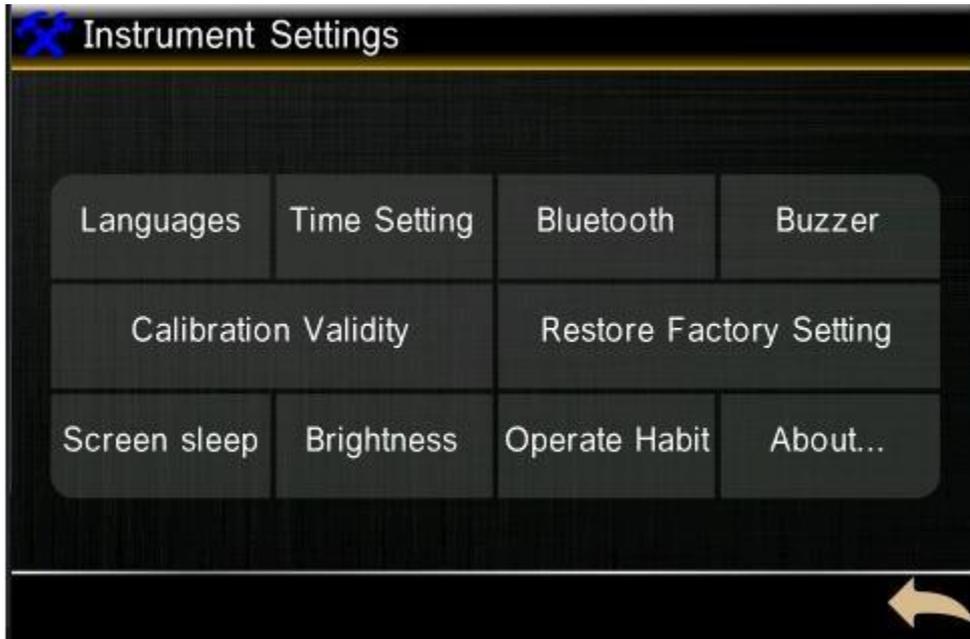

settings interface.

Figure 7 Densitometer Interface

3.3 Enter System Settings

System Settings have two quick menu screens, Settings and Calibration. Tap the icon to open the appropriate tool on the menu.

Figure 8 System Settings

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Tap the "setup" icon to enter the device setup interface, as shown in figure 9. Tap the icon "" in the lower right corner, and the screen will jump back to the main menu

interface.

Figure 9 Instrument setting interface

3.4   Viewing the Functions

This feature is available in advanced mode. Tap the icon " ▧ " or " ▧ " "to quickly switch screen views.

The dots that appear on the various measurement tool screens indicate the number of functions that have been activated for that particular tool. The highlighted dots on the screen represent the current screen, and the other dots represent the functional screens that can be switched.
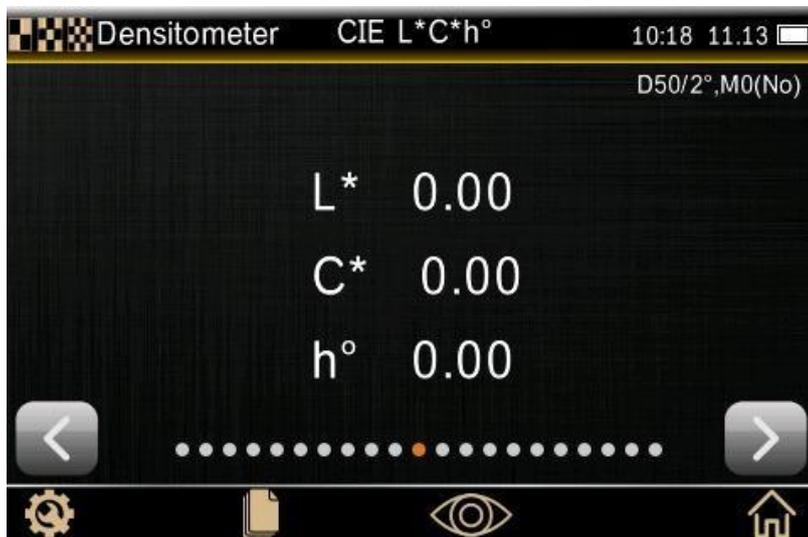

Figure 10 Viewing the Functions

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3.5   Scrolling through Options

A scrolling bar appears on screens when all options cannot be accessed at the main view.

Tap the icon " ⬤ ", on the function screen to enter the scroll option interface. The scroll bar on

the right indicates that there are other options, and you can quickly view the other options by sliding the scroll bar up and down, as shown in figure 11.

To quickly check the value of the trapping screen, tap " ⬤ ", scroll down, select" trapping "in

the scroll option interface, and click✔ "to confirm to jump to the trapping screen
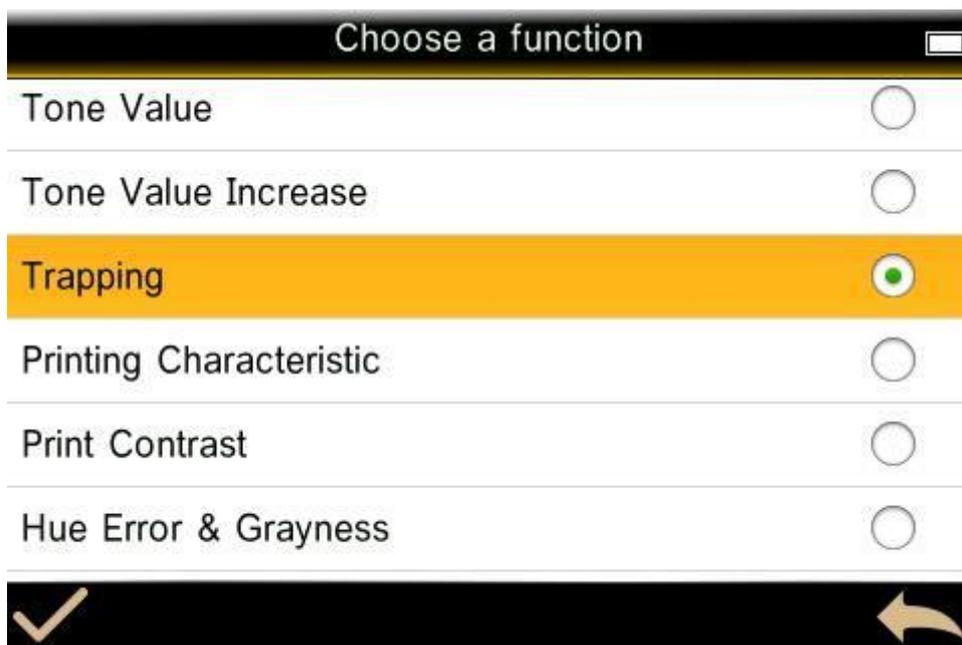
interface, as shown below.

Figure 11 Scrolling through Options "trapping"

3.6   Calibration

The instrument is equipped with a calibration box, and it will be prompted when calibration is required before measurement. Calibration before measurement can improve the accuracy of data.

Re-calibration is required as following:

1. The instrument is used for the first time.
2. Over the calibration validity.
3. Measurement conditions have been changed.
4. The calibration environment is very different from the test environment.
5. Abnormal measurement data.

Note: Dirt and dust will seriously affect the calibration of the instrument and it should be kept clean. It i s recommended to do regular cleaning.

Calibration steps：
When calibration is required, the instrument pops up a warning message, as shown in figure 13

Figure 13 Calibration expiration warning

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Locate the instrument on a flat surface, touch "OK" in Figure 13, and the instrument screen will jump to the calibration interface.
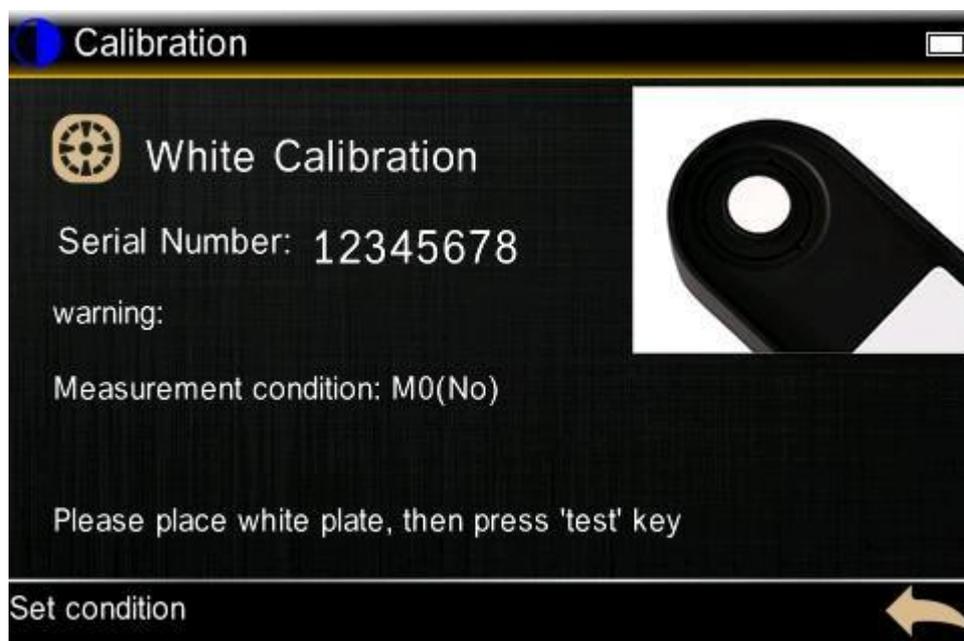

Figure 14 White calibration

After confirming the measurement conditions, place the whiteboard as required and press the "Test" button. During the calibration process, the words "Calibration..." appear in the lower right corner of the screen. After the whiteboard calibration is completed, the "Successful Calibration" reminder box will pop up, as shown in Figure 15 below.

Figure 15 White calibration success

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3. After the white calibration is completed, it will automatically enter the black calibration interface, as shown in Figure 16.
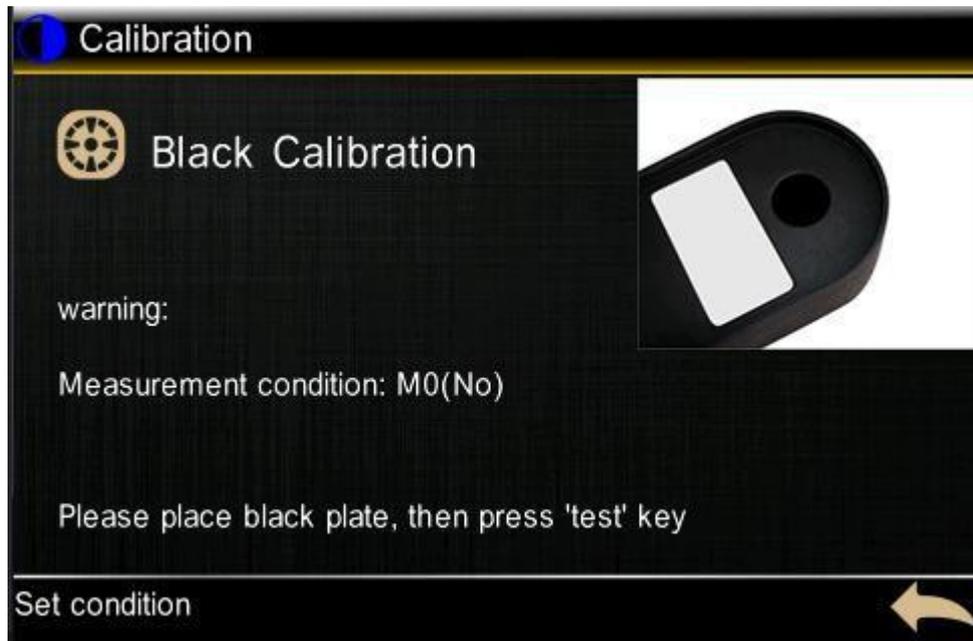

Figure 16 Black calibration

Place the blackboard as required and press the "Test" button. The steps are similar to the whiteboard correction. After the blackboard correction is completed, it will automatically jump to the main menu interface, giving the user a good operation convenience.

4 Basic Mode

View and edit the settings for this tool before making density/TVI measurements. Touch the setting icon " " in the lower left corner of the density/TVI interface (Figure 17) to select the setting options you want to edit, as shown in Figure 18
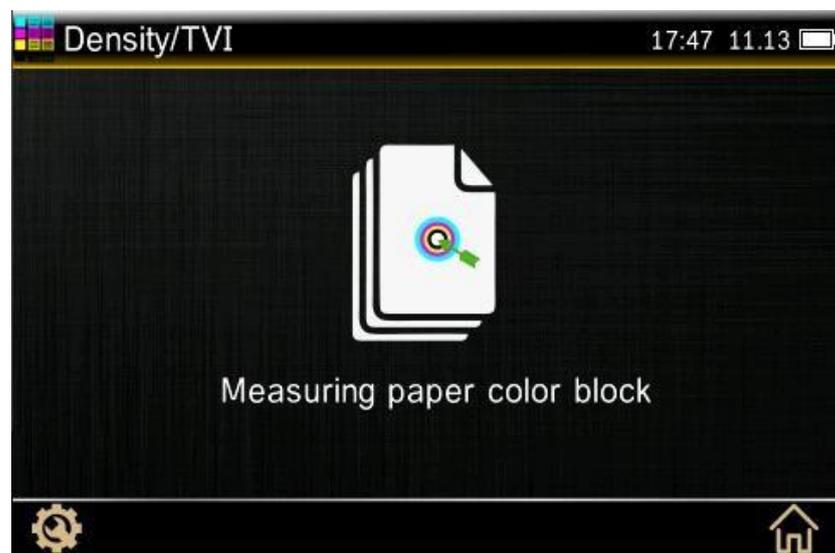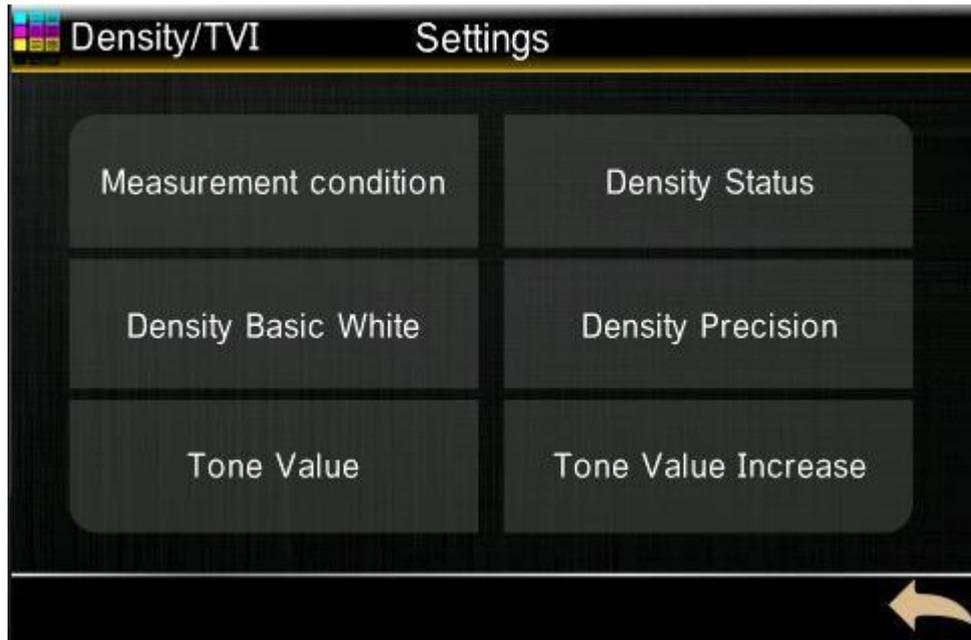
.

Figure 17 Density /TVI interface

Figure 18 Setting of density /TVI measurement

Note: the density /TVI measurement Settings here affect only basic mode and do not extend to any advanced mode.

Measurement Condition
Used to select the measurement condition for colourimetric (e.g. CIE L*a*b*) and densitometric (e.g. Density, TVI, Trapping, etc.) functions. Options are: M0, M1, M2, M3.

M0: Reflectance measured with A Illuminant, previously called: No-Filter, UV-Included.
M1: Reflectance measured with D50 Illuminant previously called: Daylight or D65-Filter. M2: Reflectance measured with A Illuminant excluding UV component, previously called: UV Cutoff Filter, UV excluded.
M3: Reflectance measured with cross-polarized A Illuminant excluding UV component,previously called: Polarization-Filter.

Density State (density / TVI only)
Used to select the status for all densitometric functions. Options are: Status A, E, I, and T.

Density White Base (Density / TVI Tool only)
Used to set a paper or absolute requirement. If you select Paper, as white base, all subsequent measurements will refer exclusively to the printed ink layer, while the paper colour effect will not be included. If you select Absolute, besides the printed ink layer, the measurement will also include the paper effect.

Density Precision (Density / TVI Tool only)
Used to select the density value display precision. Options are: Normal (x.xx) and High (x.xxx).

Tone Value (density / TVI only)

Used to set the formula for dot calculation to Murray-Davies, Yule-Nielsen, or SCTV (ISO 20654). Spot Colour Tone Value (SCTV) provides tone values of colours that correlate well with visual appearance. If a tone ramp is printed with visually equidistant steps the corresponding SCTV values should have approximately equidistant percentages from 0 to 100%.

For the Murray-Davies formula, the degree of light optical absorption is predefined. For Yule Nielsen formula, this can be adapted for different conditions.

NOTE: The Yule-Nielsen formula should only be used in special cases, i.e. to determine the physical area coverage.

Tone Value Increased (density/TVI only)

Used to set up to three tint patch percentages for tint measurements. Typically, these values are 25%, 50% and 75%.

4.1 Density /TVI Measurement

The Density / TVI Tool allows you to perform solid density and tint measurements without standards, by using the automatic patch recognition for CMYK.
The instrument will auto-detect the type of process colour (C, M, Y, K) patch as each measurement is taken.

Density/TVI Measurement Steps:

1. Select the basic mode in the main menu interface, and tap the "density/TVI" icon to enter the density/TVI measurement interface.

2. Edit density /TVI measurement Settings

3. According to the prompt, press the measuring key lightly to complete the measurement of paper.
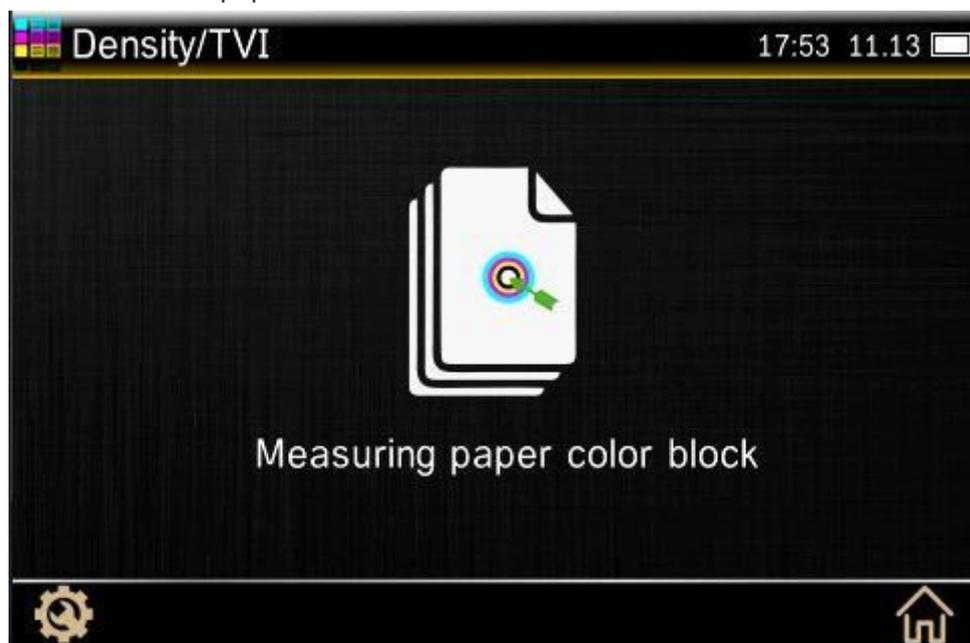

Figure 19 Density / TVI interface prompts measurement of paper patches

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4. According to the prompt, tap the "Test" button to complete the measurement of the solid patches.

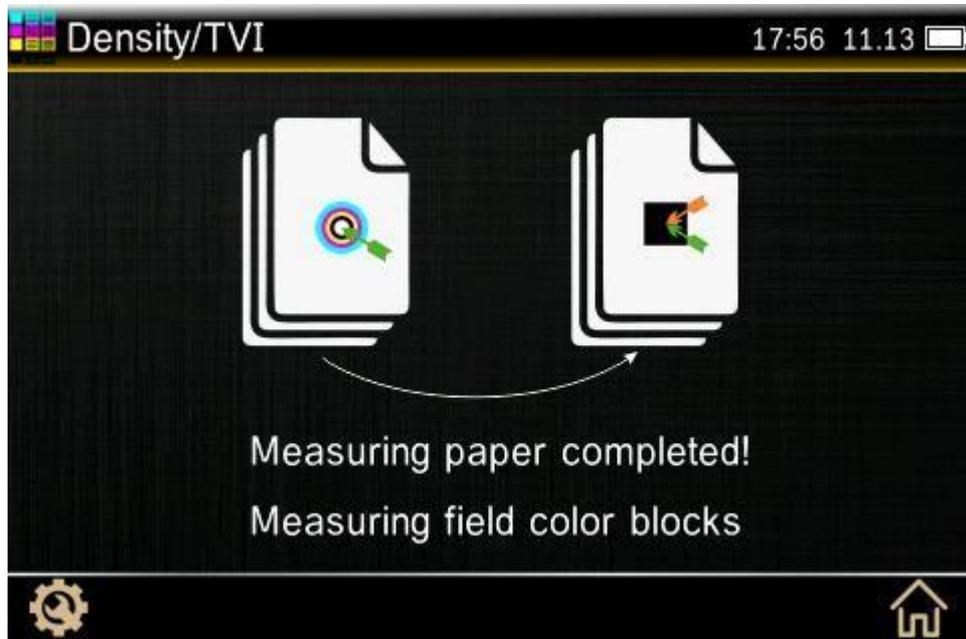Figure 20 The density /TVI interface prompts the measurement of solid patches

5.Measure the corresponding patch or another solid patch

6.Data can be viewed after measurement (click different ink areas to view other ink values)

Note: if you touch the main menu icon, all measurements will be lost.
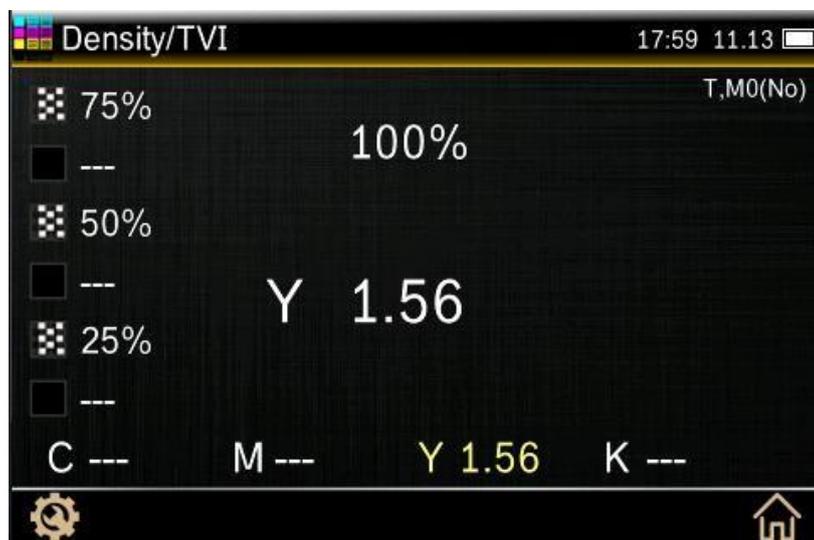

Figure 21 Density /TVI interface measurements

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4.2   L*a*b*Measurement

The CIE-L*a*b* Tool allows you to perform spot colour measurements and displays L*a*b* colourimetric data values.

Turn on the instrument and choose "Basic Mode" in the main menu interface, tap the "CIE L*a*b*" icon to enter the L*a*b* measurement interface.

L*a*b* Measuring Steps

1. Select the basic mode from the main menu interface and tap the "**CIE-L*a*b***" icon to enter the L*a*b* measurement interface

2.   Tap "Settings" and set measurement conditions (measurement conditions/light source/observe angle) according to the requirements.
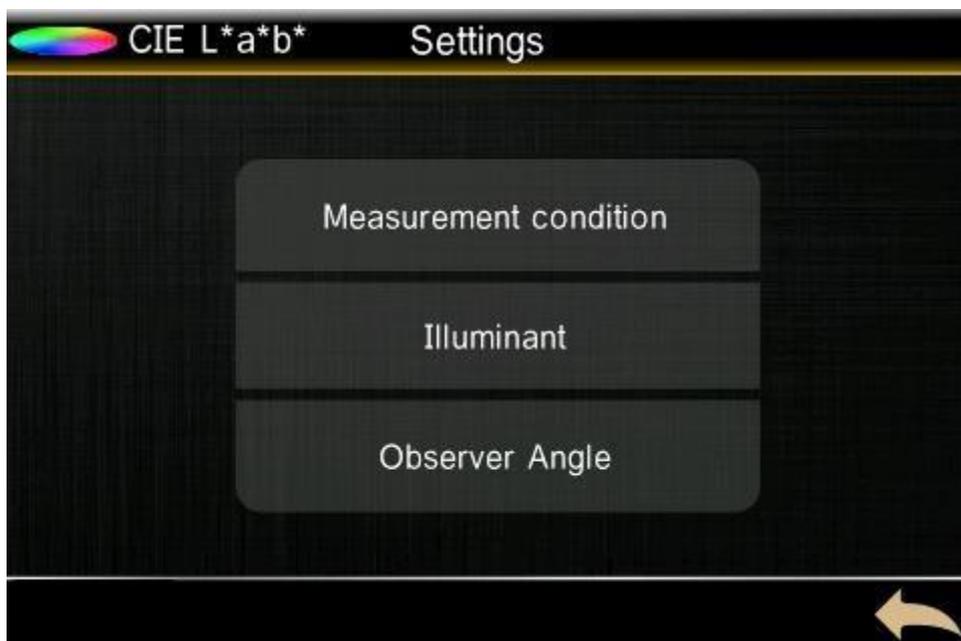
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Figure 22 CIE -L*a*b* Measurement

3.Press the measuring key lightly to complete the measurement.
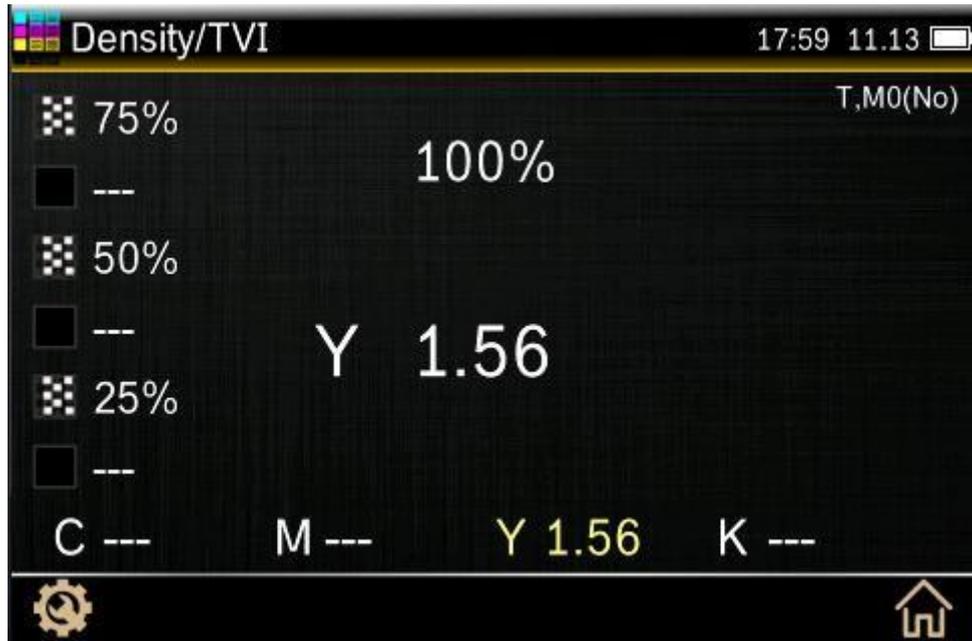
Figure 21 Density/TVI Interface Measurement Data

4.3 CIE L*a*b*

The CIE-L*a*b* Tool allows you to perform spot colour measurements and displays L*a*b* colourimetric data values.

CIE L*a*b* Measurement

1. Select basic mode in the main menu interface. Tap the CIE L*a*b* Tool icon to enter into L*a*b* measurement interface.

2. Tap the Settings icon"⚙" in the lower left corner. Set measurement conditions (measurement conditions/light source/observer Angle) as required.
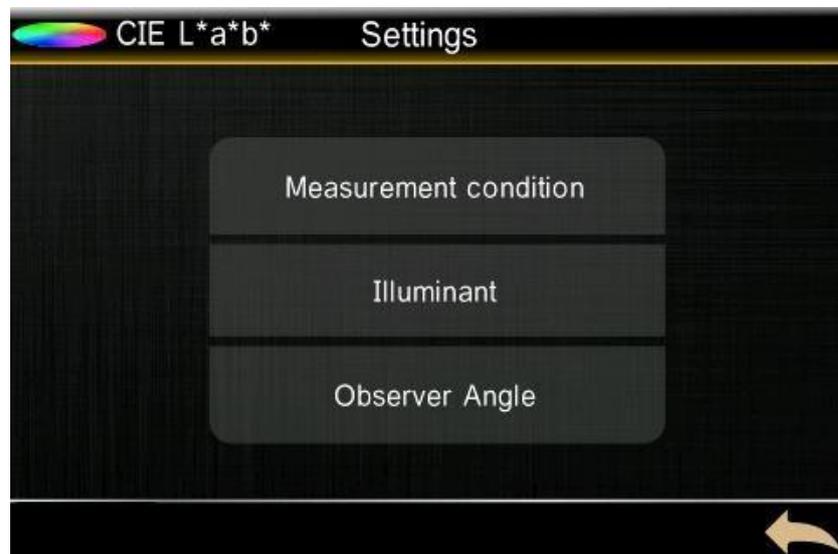
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Figure 22 CIE -L*a*b* Setting

3. Tap the measurement button to complete the measurement and view data.
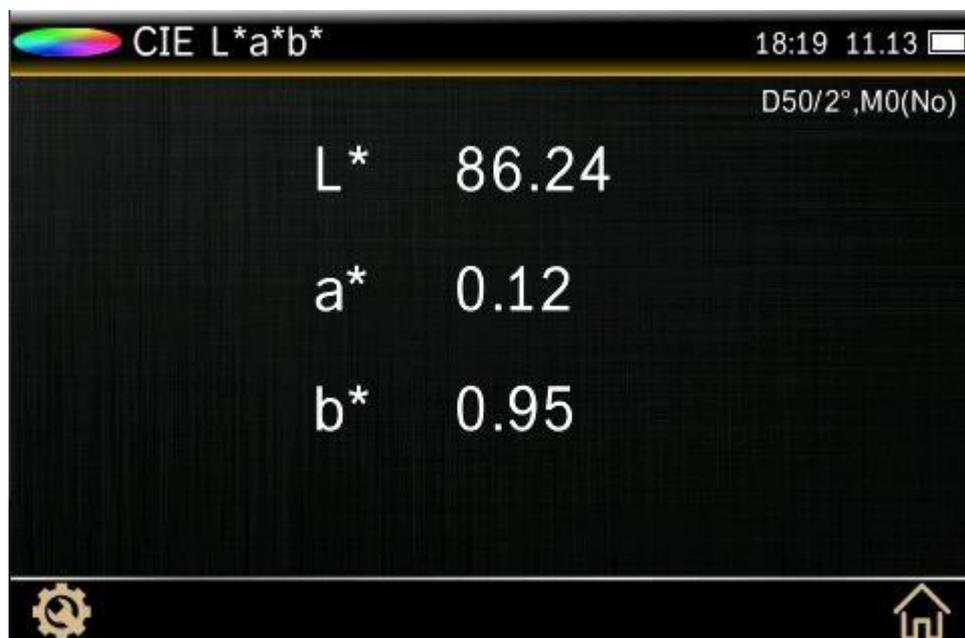
Figure 23 CIE -L*a*b*data

5 Advanced Mode

5.1 Spectrodensitometer

5.1.1 Spectrodensitometer Setting

Tap the icon" 🔅 " in the lower left corner of the screen to enter the setting interface to set all

functions of the spectrodensitometer. The interface for density (such as density, overprint, etc.) and colour selection (CIE) is different.

The interface for setting density functions (such as density, overprint, etc.) includes: measurement condition, density status, density white base, density precision, tonal value, tone value increase (dot gain) function, all densities, overprint, average measurement. Tap the

icon" ▼ " at the bottom of the interface to view and edit the Settings of the density

function. As shown in figure 24 and 25:

Measurement Condition

M0(No) – No Filters

M1(D50) -

M2(UVC) – UV Cut Filter

M3(Pol) – Polarization Filter (eXact Xp excludes M3)

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Density Status

Used to select the status for all densitometric functions. Options are: Status T, E, I, and A.

Density White Base

Used to set a paper or absolute requirement for various density functions. If you select Paper, as white base, all subsequent measurements will refer exclusively to the printed ink layer, while the paper colour effect will not be included. If you select Absolute, besides the printed ink layer, the measurement will also include the paper effect.

Density Precision

Used to select the density value display precision. Options are: x.xx and x.xxx (Two decimal places and three decimal places).

Tone Value

This function (also called Dot Area) provides a way to determine the absolute ink coverage (%) of a tint or halftone patch by comparing the density value of the tint patch versus known 0% (Paper/Substrate) and 100% (solid patch) density values. The result can be calculated using either the Murray-Davies, Yule-Nielsen, or SCTV (ISO 20654) methods.

Tone Value Increase Function

Set up to three tint patch percentages for tint measurements. Typically, these values are 25%, 50% and 75%, however, you can also enter custom values.

All Densities

There are CMYK and CMYK+ spot colour options.

Trapping Function

Set the trapping formula. Options are: Preucil, Brunner, and Ritz.

Average Measurement

Used to set the required number of measurements to obtain an average, usually 1-99 times.

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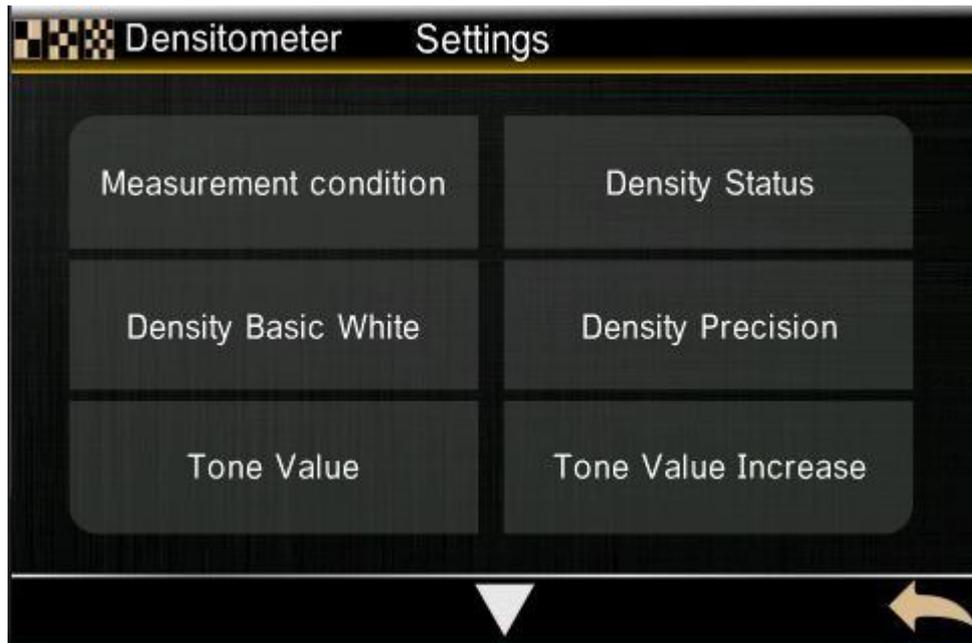
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Figure24 Spectrodensitometer for density function Settings interface 1
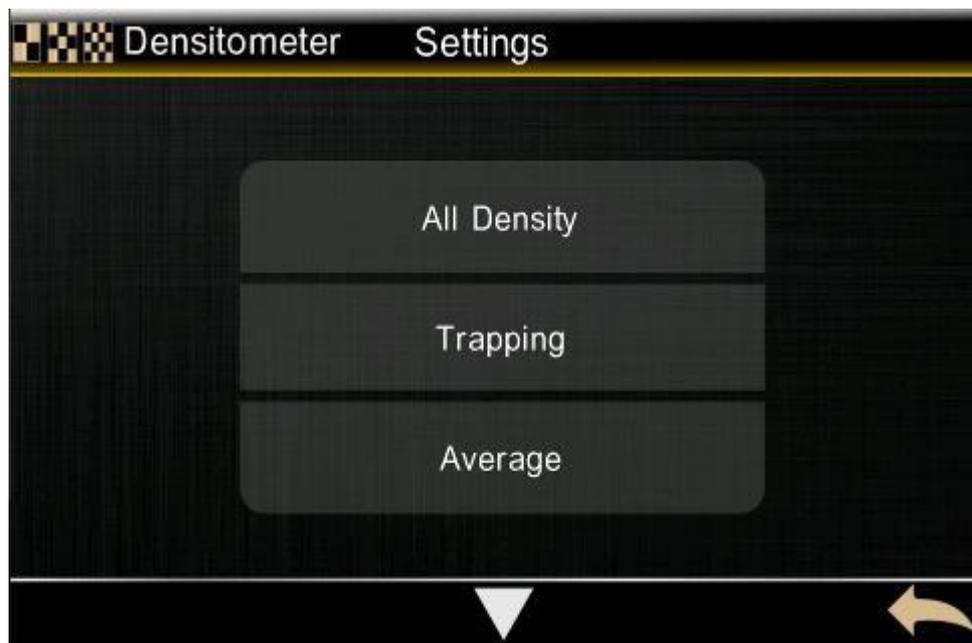

Figure 25 Setting Interface of Densitometer 1

The Settings for selecting the colourimetric function include: measurement condition, light source, observer angle, average measurement. See figure 26.

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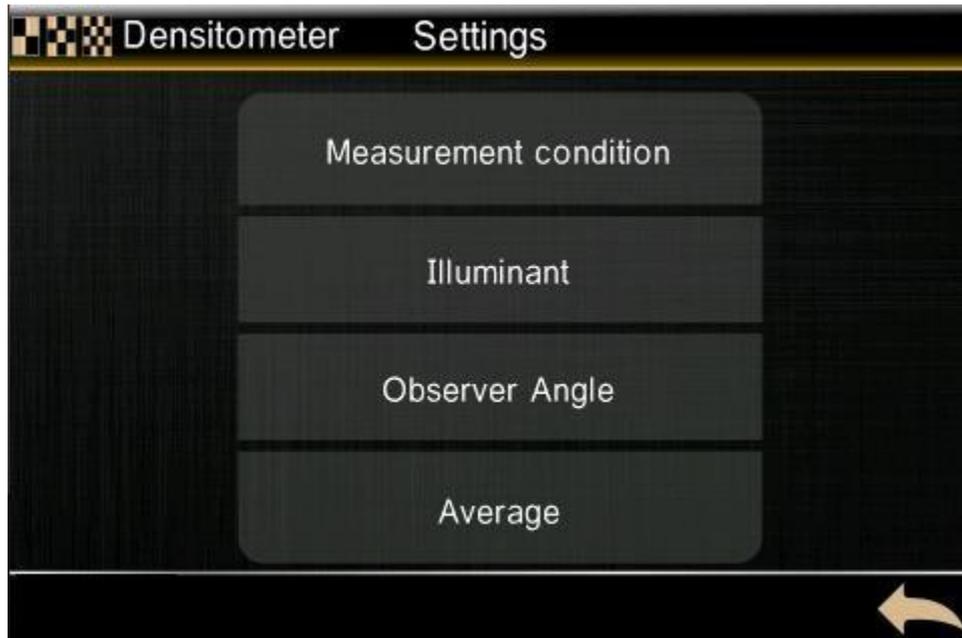
Figure 26 Setting Interface of Densitometer 2

Light Source

For selecting the light source options, the light source includes D65, D50, D55, D75, A, C, F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12. (note: some models only have some light source options.)

Observer Angle

The observer Angle option includes 2°and 10°.

5.1.2 Density

This function is the measure of the ink thickness. For the process colours Cyan, Yellow, Magenta, or Black the desired Density Status (A, E, I, T) needs to be configured. For spot inks the result is given as the density value at the wavelength of maximum density for the spectral curve. This function can be optionally configured to subtract the white base/substrate.

Tap the icon " "on the right side of the density function screen, and Jump to the set density colour interface, you can set which colour response to display.

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Figure 27 Set the density colour interface

1. There are automatic, C, M, Y, K and spot colour options setting density colour interface. Auto colour picks the dominant colour response and also displays the last measurements for the other colours (C, M, Y, and K). Spot colour picks the dominant spectral density wavelength. You can manually select the colour response as well (C, M, Y, or K). In Job tools, the colour response shown depends on the particular patch measured.
2. Density Measurement
3. Set measurement condition.

4. According to the setting of the density white base, select the light touch icon "▣"to measure the paper colour block.

5. Select density condition.
6. Set density colour (auto or spot colour, etc.).
7. Measure sample.
8. Finish measurement and view data.

Figure 28 Density Interface

5.1.3 All Densities

This function displays the density values for the measured sample for all filters (Cyan, Magenta, Yellow and Black). This function can be configured to show additionally the density value at the wavelength of maximum density for the spectral curve.
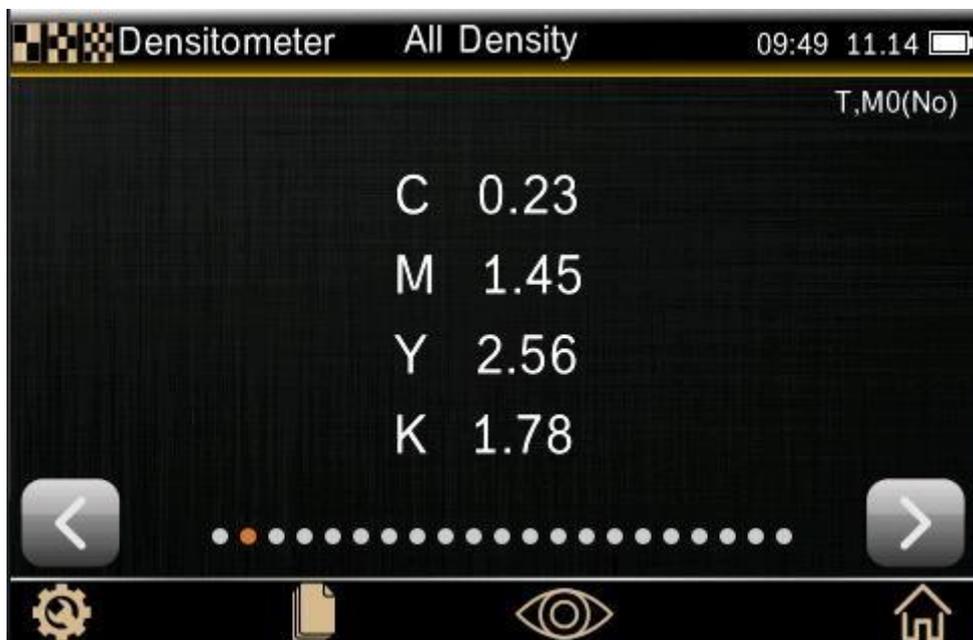

Figure 29 All Densities Interface

All densities measurements are the same as density measurements, just select all density functions in step 3. When all densities functions are regarded as a setup tool, and the options are: CMYK and CMYK+SPOT.

5.1.4 Tone Value Function

This function is also called Dot Area.it is to point to the sum of all dot area of cluster on unit area and the ratio of total area, reflected the coverage of ink. The result can be calculated using either the Murray-Davies, Yule-Nielsen, or SCTV (ISO 20654) methods.

Spot Colour Tone Value (SCTV) provides tone values of colours that correlate well with visual appearance. If a tone ramp is printed with visually equidistant steps the corresponding SCTV values should have approximately equidistant percentages from 0 to 100%. For the Murray-Davies formula, the degree of light optical absorption is predefined. For Yule-Nielsen formula, this can be adapted for different conditions. When Yule-Nielsen formula is selected for the colour, you set the coefficient.

NOTE: The Yule-Nielsen formula should only be used in special cases, i.e. to determine the physical area coverage.

Tone Value Measurement

Displays tone value for the selected colour. The procedure requires one solid and one tint measurement.

1. Select Tone Value function.

2. Tap the icon " " and set density colour.

3.Tap the icon" " and measure paper. Once paper is measured it is not required until there is a new substrate.

4. Measure solid patch.

5. Measure tint patch that corresponds to the measured solid.

6. View tone value data for the tint patch.

7. Continue with additional tint patches that correspond to the measured solid, or touch the solid patch on the left of the screen and measure another solid patch.

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Figure 30 Tone Value Interface

5.1.5 Tone Value Increase Function

This function is also called Dot Gain. It is the difference between the actual Tone Value and the theoretical screen of a tint patch. The theoretical tint percent are configured by the TVI function settings (1 to 3 patches).

Tone Value Increase Measurement

Displays tone value increase for the selected colour. The TVI settings define how many tint patches are used.

1. Select Tone Value increase (Dot Gain) function.
2. Select Colour option if required.
3. Measure paper.
4. Measure the solid patch.
5. Measure tint patch that corresponds to the measured solid. You can either follow the measurement sequence on the screen or manually touch the tint patch on the left of the screen to measure.
6. Continue with additional patches that correspond to the measured solid.
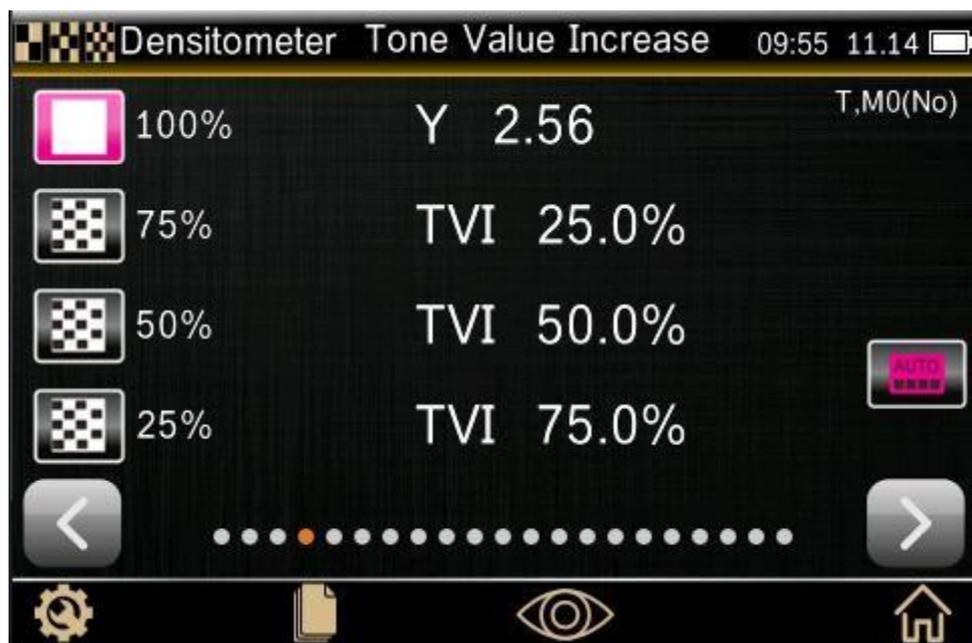7. View tonal value increase (dot gain) data for the tint patches.

Figure 31 Tone Value Increase Interface

5.1.6 Trapping

This function is to measure the degree of ink overprint physical quantity. The higher the value, the better the overprint effect. This value describes the ratio of the ability of the post-printing ink to adhere to the previous printing ink to the ability of the ink to be printed on the blank form. Setting the colour response to Auto mode will operate Trapping with the process inks; use the Spot

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setting if using spot colours instead.

Trapping interface displays the solid ink densities and overprint values. The procedure requires the first ink down, second ink down, and overprint measurements.

There are three ways to calculate overprint value: Preucil-(default), Brunner, and Ritz. It can be adjusted by setting.

Trapping Measurement

1. Select Trapping function.
2. Measure paper. Once paper is measured it is not required until there is a new substrate.
3. Measure 1st ink down patch.
4. Measure 2nd ink down patch.
5. Measure overprint patch.
6. View data.
7. Continue with additional trap measurements.

Figure 32 Trapping Interface

Note: after measuring the colour block, touch the colour block on the left side of the screen and re-measure the colour block as required.

5.1.7 Print Characteristics

This function plots out a series of tone value measurements made against a step wedge target. You start out reading the solid and then the graph will automatically take you through each

defined step. By tapping the arrows " ◀ " or " ▶ " on either side of the graph, you can revisit previous measurements to re-measure them or view their results.

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Print Characteristics Measurement

1. Select Print Characteristics function.

2. Select Colour option if required (Setting density colour).

3. Measure paper.

4. Measure the lowest step patch in the sequence (i.e. 10%).

5. Continue with additional step patches in an incrementing order until finished.

6. View data by tapping the arrow icons "◀" or "▶" to scan through the steps.
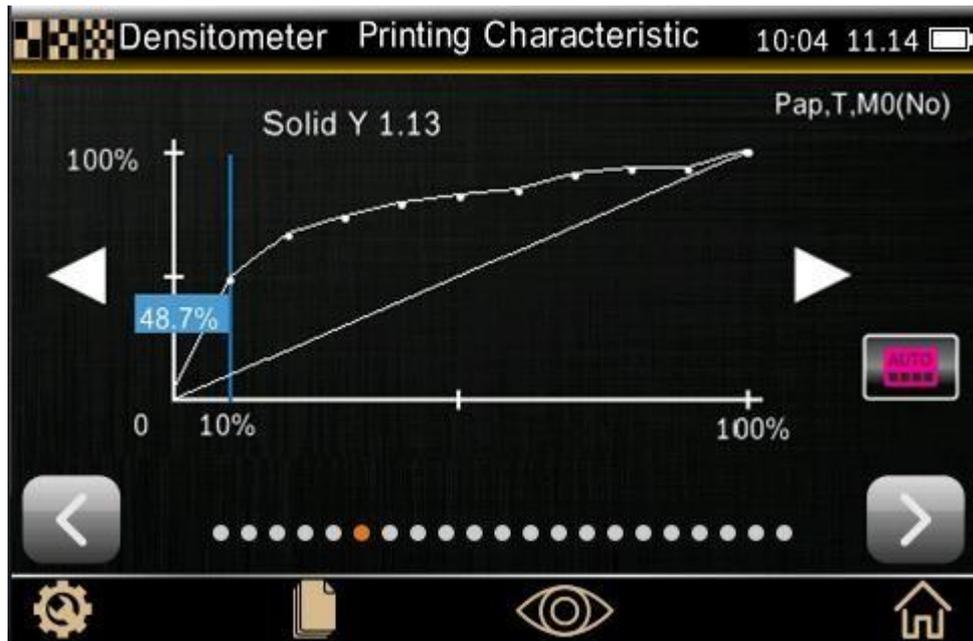

Figure 33 Print Characteristics Interface

Note: if you need to manually go back to view the previous measurement result or re-measure, tap the arrow icon on both sides of the icon "◀" or "▶".

5.1.8 Print Contrast Function

This function is used to control the image to dark tone index. It can determine proofing and printing standard ink. This value is the ratio of the difference between the actual density of the image and the integral density of a point in the image that is dimmed to the actual density.

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Figure 33 Print Contrast Interface

Print Contrast Measurement:

1. Select Contrast function.

2. Select Colour option (Setting density colour).

3. Measure paper if required.

4. Measure solid patch.

5. Measure tint patch that corresponds to the measured solid.

6. View data.

7. Continue with additional tint patches that correspond to the measured solid, or touch the solid patch on the left of the screen and measure another solid patch.

5.1.9 Hue Error and Grayness Function

Hue error is due to the ink colour is not pure, so that the selection of the spectrum of malabsorption, resulting in no density. Grayness indicates the presence of gray in a colour that makes it appear less saturated. Hue Error and Grayness are used to check for colour consistency throughout a press run.

Hue error and grayness values are displayed along with colour toward colour. For example, Y->M indicates the colour is yellow toward magenta.

Hue Error and Grayness Measurement

1. Select Hue Error & Grayness function.

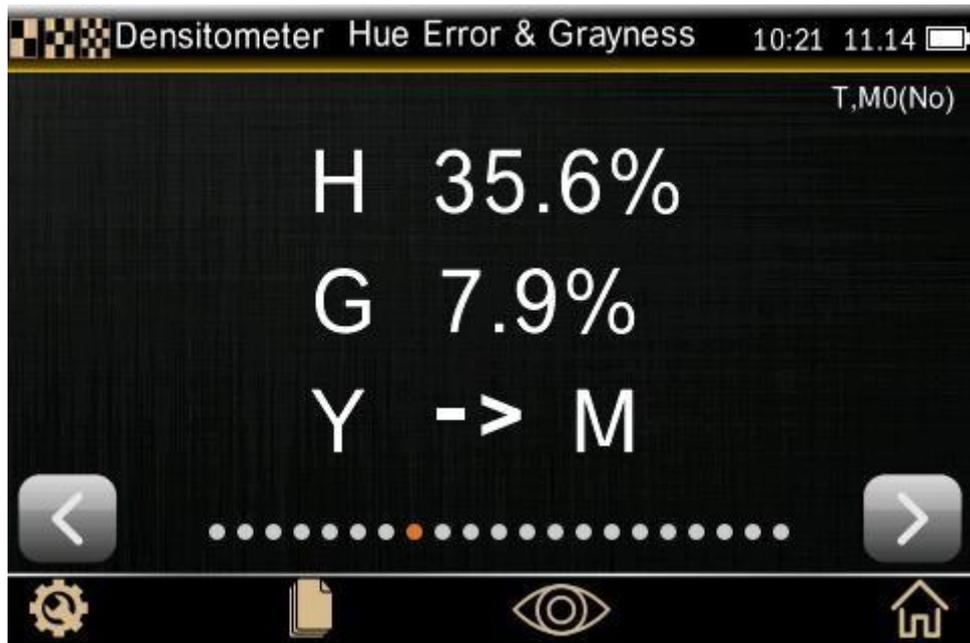2. Measure paper if required.

3. Measure solid patch.

4. View data.

Figure 35 Hue Error and Grayness Interface

5.1.10 CIE Chroma Function Series

CIE L*a*b*

This feature is based on how the human eye perceives colour in an effort to be perceptually uniform. The date describes all the colours that a person with normal vision can see. L* indicates lightness. a * indicates the range from red to green. b* indicates the range from yellow to blue.

D+CIE L*a*b*

This function allows you to view a density result as well as L*a*b* values in the same results area. The modes (Auto and Spot) will display either the dominant process ink (C, M, Y, or K) or the dominant spectral density response.

CIE L*C*h*

This function is a colour space equivalent to CIEL*a*b*, the main difference is that in L*a*b* the colour values are plotted in a Cartesian coordinate system, while L*C*h*is polar coordinate system. L* stays the same, but C* refers to chroma and h* is the hue angle.

D+CIE L*C*h*

This function allows you to view a density result as well as L*C*h* values in the same results area. Setting density colour will display either the dominant process ink (C, M, Y, or K) or the dominant spectral density response.

CIE XYZ

CIE assumes the theoretical three primary colours XYZ and accordingly forms the XYZ colour space, which is based on the direct measurement of human colour vision and serves as the defining basis for many other colour Spaces. Y stimulus value represents the brightness of the colour, also represents the chromaticity. The X and Z stimuli only represent chromaticity, not brightness. The tristimulus value of the measured colour is the number of primary colours in the additive pattern required to match the test colour.

CIE Yxy

This function is directly derived from XYZ values. Y still represents luminance or brightness of a colour. The x and y are calculated from the XYZ values. It is colour coordinate of colour.

CIE Function Measurement:

1. Select colourimetric functions CIE L*a*b*, CIE L*C*h°, Density + L*a*b*, Density + L*C*h°, Best Match, Best Match Table or Delta E Trend.

2. Tap the setting icon " ⚙ " in the lower left corner to enter the setting and editing interface (refer to section 5.1.1 for details)

3. Measure sample.

4. View data.

Figure 36 CIE lab Interface

5.1.11 Printing Plate Function

This function is used to determine the dot area coverage of a tint or halftone patch on a printing plate.

Printing Plate Function Setting:

1. Select Printing Plate function.

2. Measure the plate ground.

3. Measure solid patch.

4. Measure tint patch that corresponds to the measured solid.

5. View data.

6. Continue with additional tint patches that correspond to the measured solid, or touch the solid patch on the left of the screen and measure another solid patch.
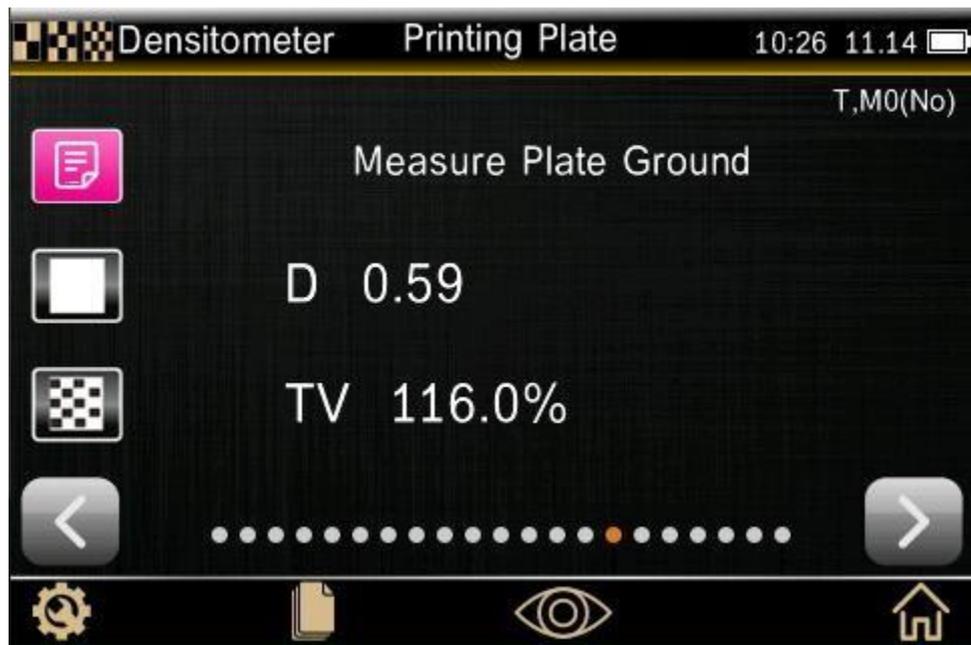
Figure 37 Printing Plate Interface

5.1.12 Reflectance Graph

This function visually displays the reflectivity of measured data in the form of a graph. Sample and standard are displayed with different colours: sample in white, standard in blue.

By tapping the " " or " "button, the light wave wavelength, sample reflectance and sample reflectance difference of the current test sample (in the basic comparison module) are switched at intervals of 10nm.

Reflectance Graph Measurement

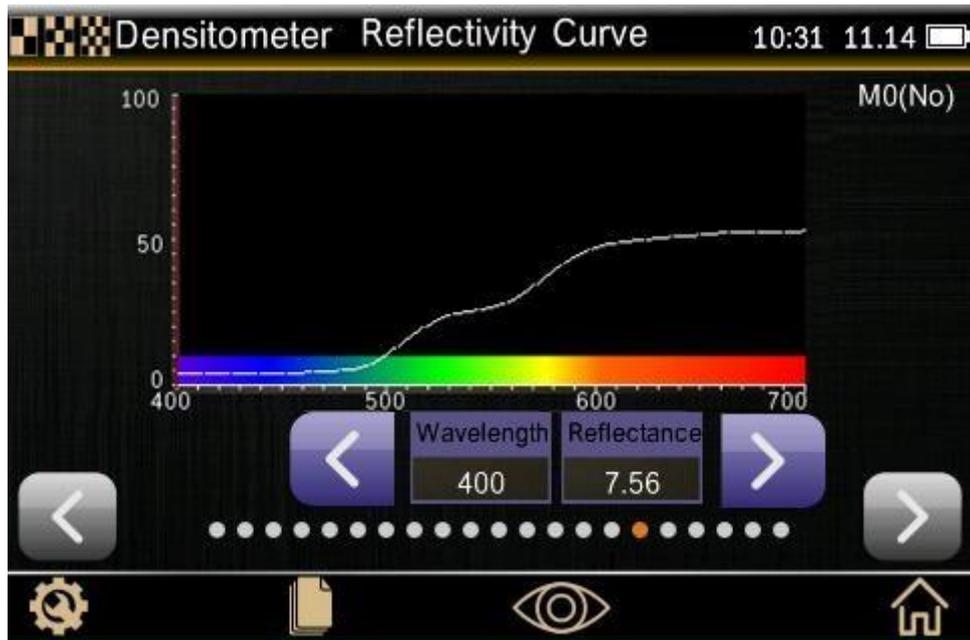1. Select Reflective Graph function.
2. Measure sample.
3. View data.

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Figure 38 Reflectance Curve Interface

5.1.13 Paper Parameter (Partial Models Include)

Paper parameter (partial models include) this function can report yellowness, whiteness data. Display 1 to 4 lines of data according to function Settings.
Paper parameter setting:

Touch the icon " " in the lower left corner of the paper parameter measurement

interface to select the paper parameters that appear after the test, as shown in figure 39.

Yellowness: used to evaluate white and near-white samples. These samples yield numbers which
correlate with visual rating of yellowness and near-white samples. These samples yield numbers which correlate with visual rating of yellowness.
Whiteness: used to evaluate white and near-white samples. These samples yield numbers which correlate with visual rating of whiteness.
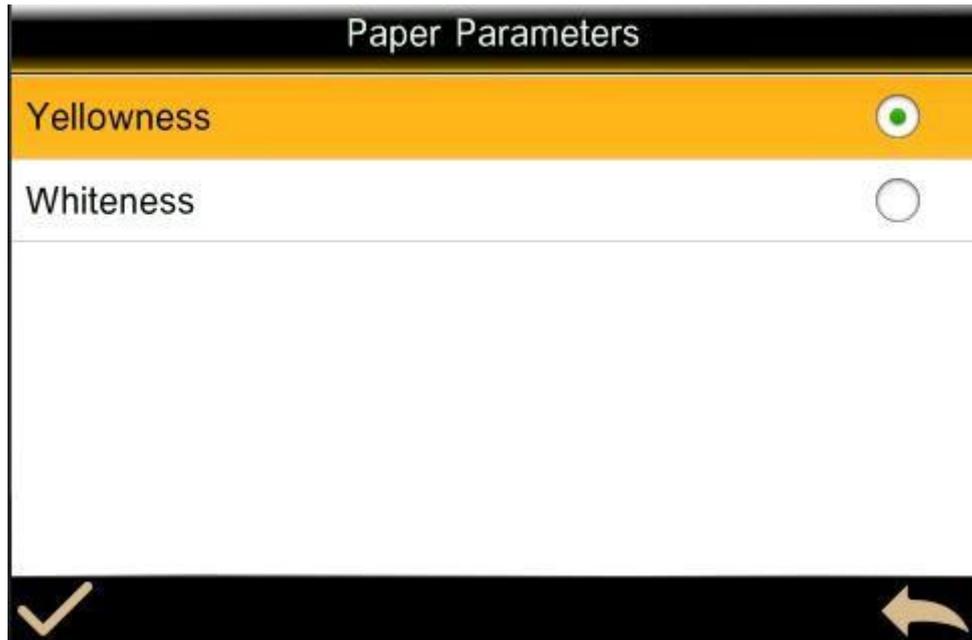
Figure 39 Paper Parameters Interface

Paper Parameter Measurement

1. Select Paper Indices function.

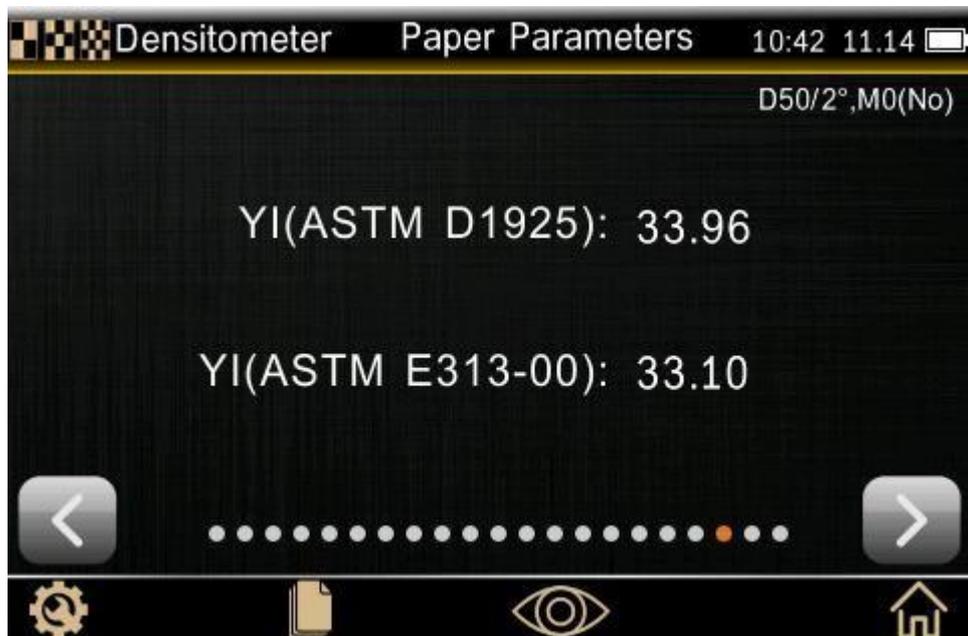2. Measure paper sample.

3. View data.

Figure 40 Paper Parameters Interface

5.1.14 Colour Intensity (Partial Models Include)

The absolute colour strength "K/S" is a measure for the concentration of a colour.
To determine the colour strength, you must first choose one of the available calculation methods: Max K/S: K/S is calculated at Point of minimum reflectance in the spectral curve.

Mean XYZ: Calculates colour strength by average mean XYZ values across the visible spectrum. Next, select the type of ink that is used to determine the colour strength. You can choose Transparent ink, Opaque ink or Textile dye.
Colour Strength measurement

1. Select colour strength function 2. Measure paper if required.
   3. Measure the sample.
   4. View data.

Figure 41 Colour Intensity Interface

5.1.15 Opacity Measurement (Partial models Include)

This function is used to determine how opaque a given ink or material is. It looks at how different the luminance (Y from CIE XYZ) of a given sample changes when printed over a white or black substrate. Once the ink is measured over both substrates, the opacity % result is provided (0 = completely transparent, 100% = completely opaque).

Opacity Measurement:

1. Select the opacity function
2. Measure the sample over the black portion of the opacity card.
3. .Measure the sample over the white portion of the opacity card.
4. View data.

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Figure 42 Opacity Interface

5.2　　Basic Comparison

Basic comparison is another module of the advanced model, with one more measurement standard than the density meter. Basic comparison is a quick way to compare standard samples and samples without storing data.

5.2.1 Basic Comparison Settings

Click the icon in the lower left corner of the screen to access all the functions of basic comparison "⚙" . Apart from the setting interface of density function（e.g.：density, overprint, etc.) and colour selection function (e.g.: CIE function), the setting interface of other functions is also slightly different
.

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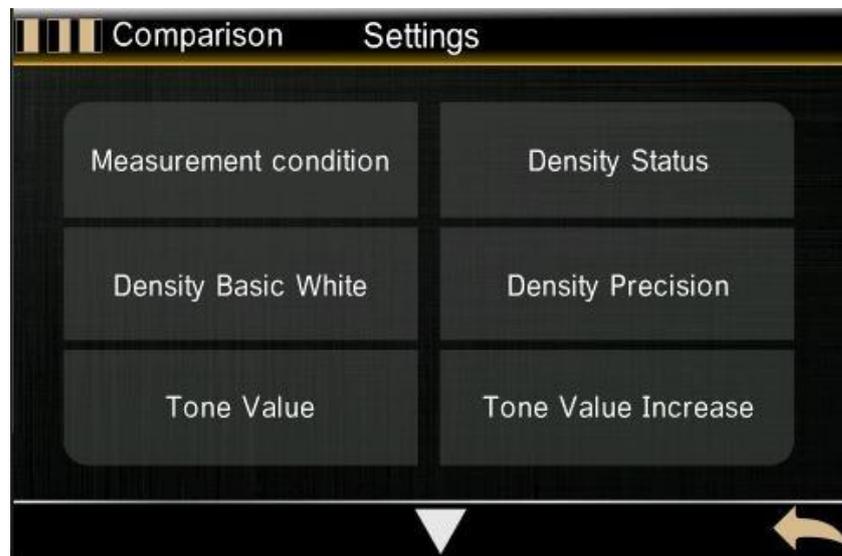Testing climate resistance to the limit
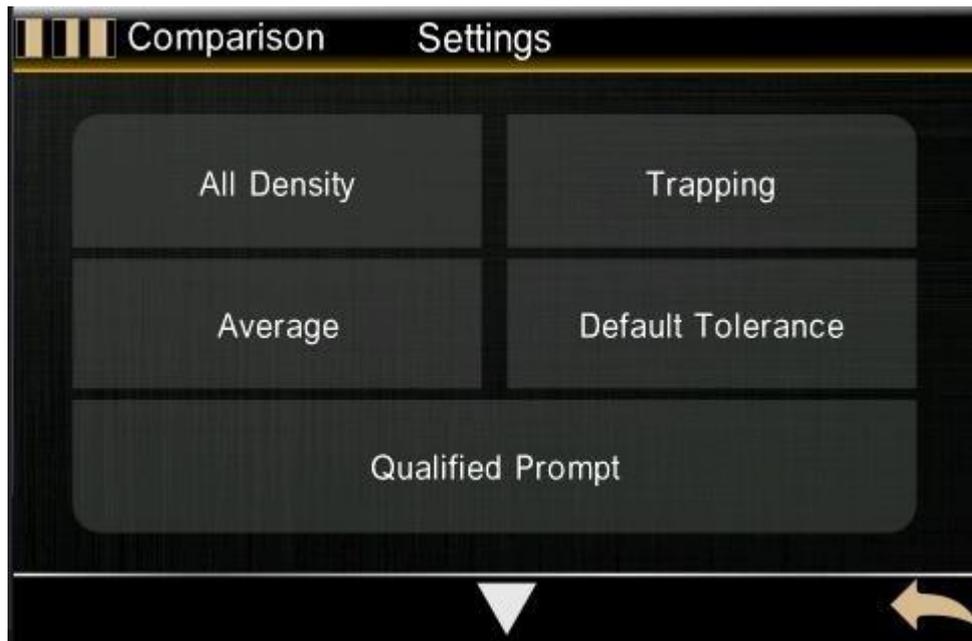
Figure 43 Comparison Setting Interface 1

Figure 44 Comparison Setting Interface 2

The density function setting interface in basic comparison mode has two more items than that of the density meter: default tolerance and qualified and unqualified prompt.
And it has four more options than the densitometer's colour selection interface: Chromatic aberration formula, colour deviation, default tolerance, qualified and unqualified prompt.
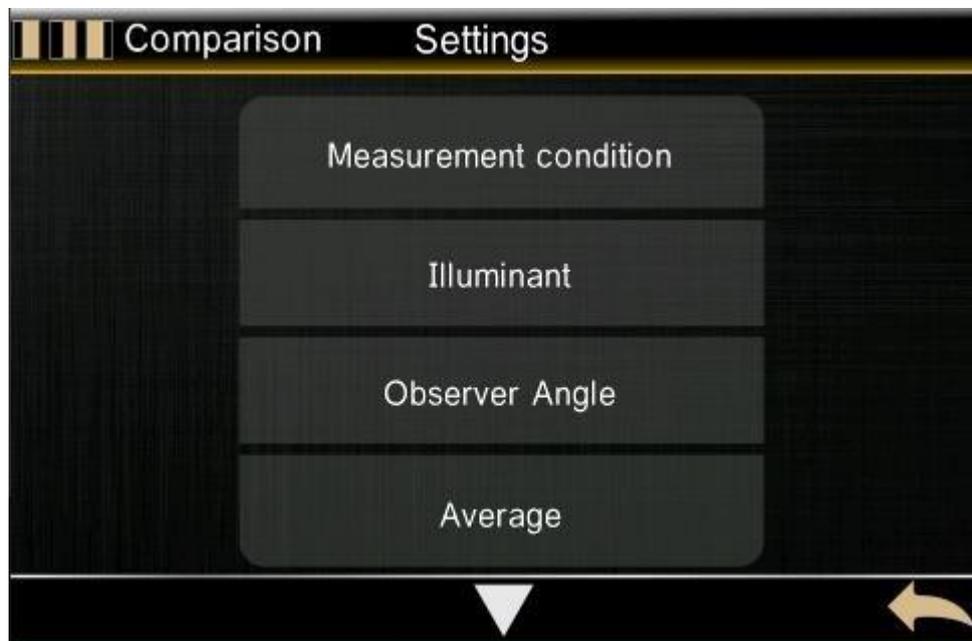

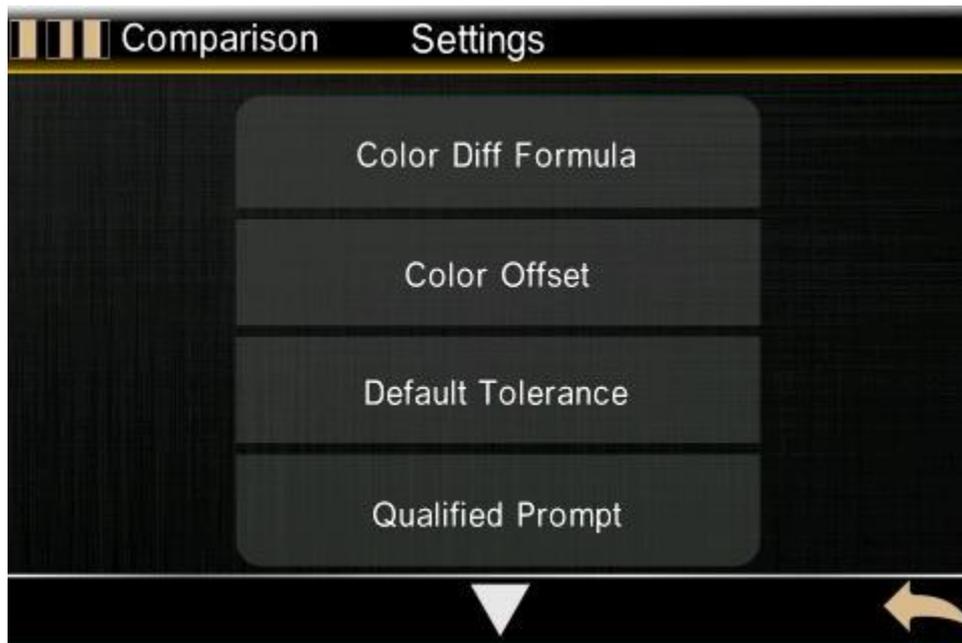Figure 45 Comparison Setting Interface 3

Figure 46 Comparison Setting Interface

Colour difference formula: the user can choose ΔE *, ΔEcmc (2:1), ΔE94, ΔEcmc (1：c) formula.

Colour deviation: when comparing the sample with the standard, you need to turn on the colour deviation in the Settings interface, so that there will be a hint of colour deviation.

Default tolerance: The default Settings ΔE *, - ΔL *, + ΔL *, - Δa *, + Δa *, - Δb *, + Δb * values, it provides the basis for the comparison between the sample and the standard.

Pass/Fail indication: The pass/fail prompt will show a difference depending on the type of each function and tolerance. If the currently measured sample value exceeds the incremental value of the set tolerance, "Failed" will be displayed next to it.

5.2.2 Basic comparative measurement

To make a basic comparison, the first step is to set the criteria against which each subsequent measurement will be compared. If necessary, the standard sample can be re-measured.

Basic comparative measurement:
1. Tap the "basic comparison" icon on the screen in advanced mode to enter the basic comparison interface (take density function as an example)
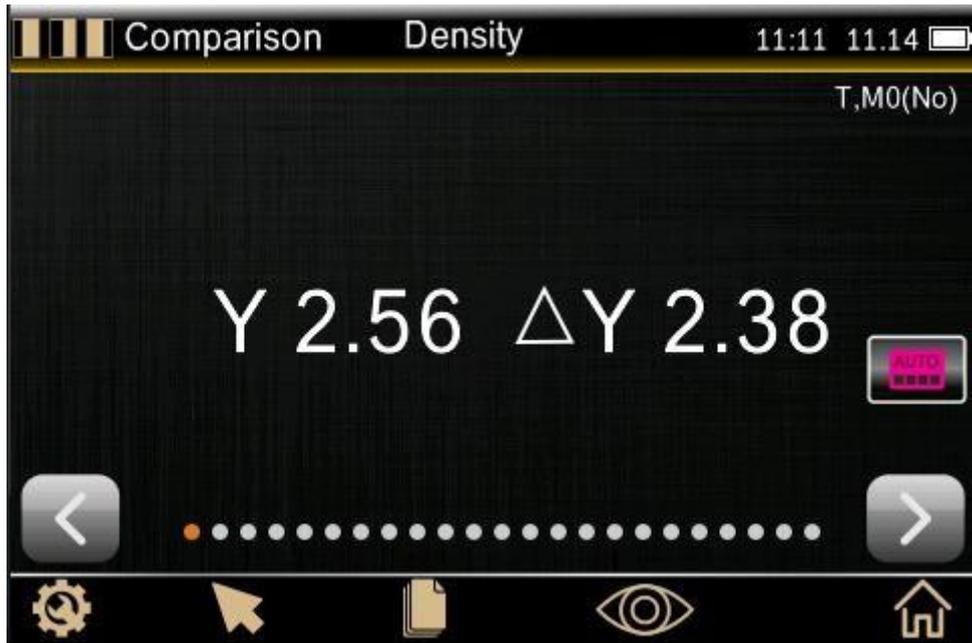
Figure 47 Comparison - Density interface

2. Tap "standard" to enter the measurement standard interface
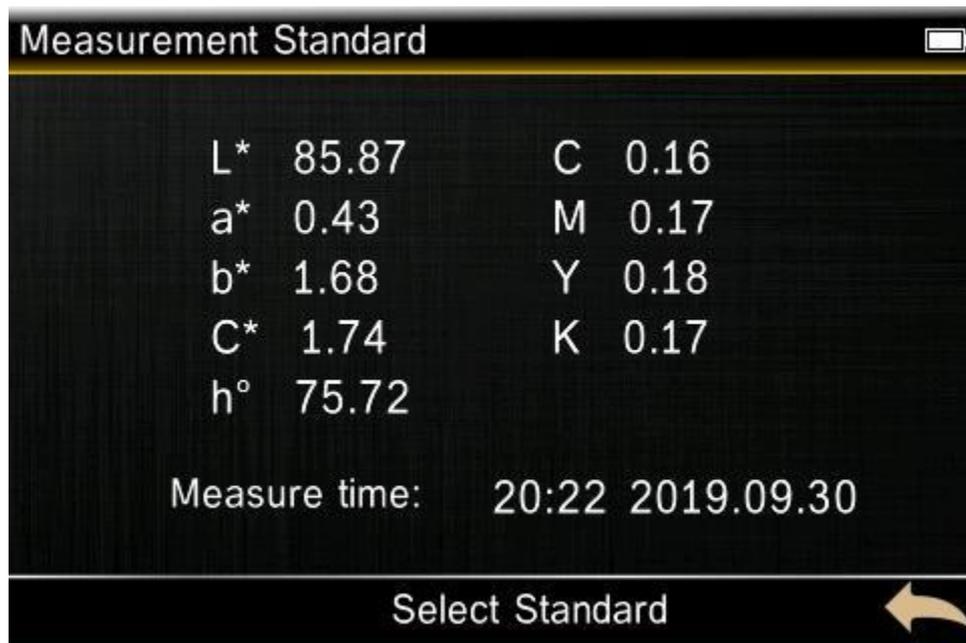3. Measure the standard or select the standard that has been measured

Figure 48 Measurement Standard Interface

If you need to select a standard, jump to the standard record interface, you can delete the record, edit the name, standard call, etc. for the selected standard record.
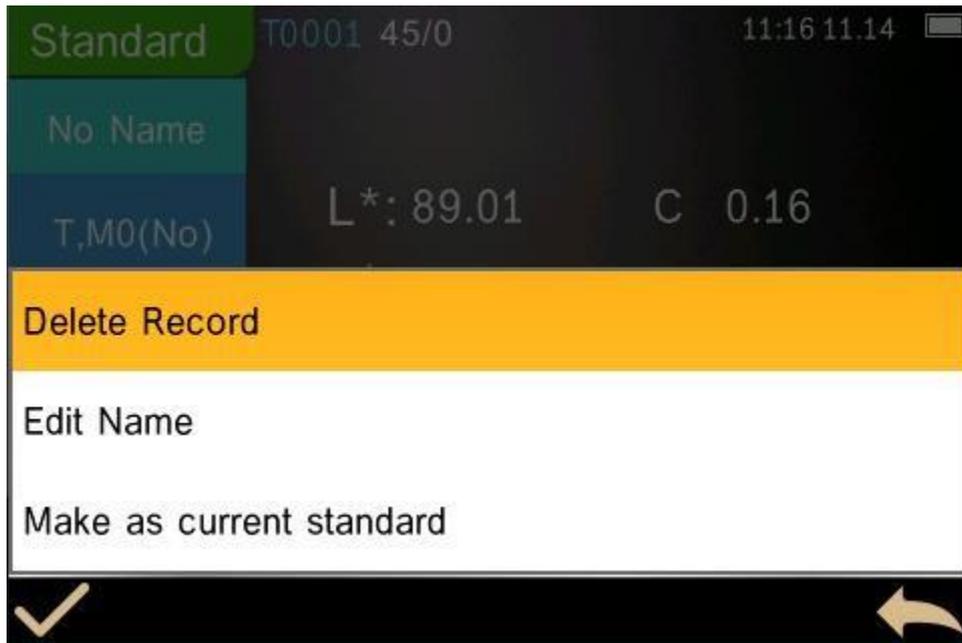
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Figure 49 Select Standard record

4. After selecting the required standard, tap the return icon to return to the basic comparison interface ⬅, Return to the basic comparison interface.

5. If necessary, tap "Paper" and measure the paper.

6. Tap "View" to select the option function used for comparison. 7.Measuring samples.

8. View measurement comparison results.

9. Continue with other sample measurement comparisons or choose to change colour options or criteria for comparison.

5.2.3 CMY Balance

This function is used to compare a Gray Balance Patch to a defined standard with easy to read graphical indication. This function requires a standard with target CMY density values plus a tolerance function setting.

Above the result is the absolute CMY density value and relative difference of the sample. Below the result area is a bar graph showing the delta difference for each ink compared to the target value. The center line of the graph represents the target value, and the bars in both directions indicate that the density value of the sample is higher or lower than the target value. The goal of this function is to determine that all three CMY densities of the sample meet the tolerances around the target and the sample can still be considered gray.

CMY Balance Measurement

1. Select CMY Balance function.
2. Measure paper if required.
3. Measure the gray balance standard.

4. Measure sample.

5. View data.
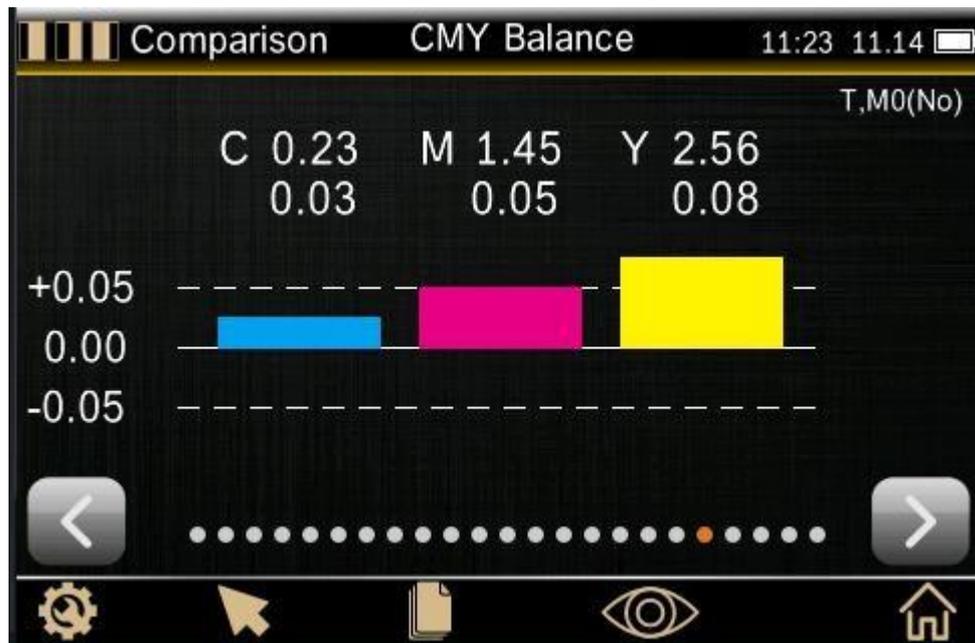
Figure 50 Comparison of CMY balance Interface

5.2.4 Metamerism

The phenomenon where two colours appear to match under one light source (ΔE deviation is small), yet do not match under different light sources (the ΔE deviation is relatively large). Two such colours are called a metameric pair.

Metamerism Function Setting

The metamerism function setting is slightly different from the other basic comparison settings for selecting the chroma function. Touch the setting icon "⚙" on the left side of the metamerism function interface to set the light source/view combination, as shown in Figure 51.

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Figure 51 Comparison Setting Interface 1

Metamerism Measurement：

1. Select the metamerism function in the basic comparison mode.
2. Measure or select a standard.
3. Measure the sample.
4. View measurement

results.

Figure 52 Metameric Interface
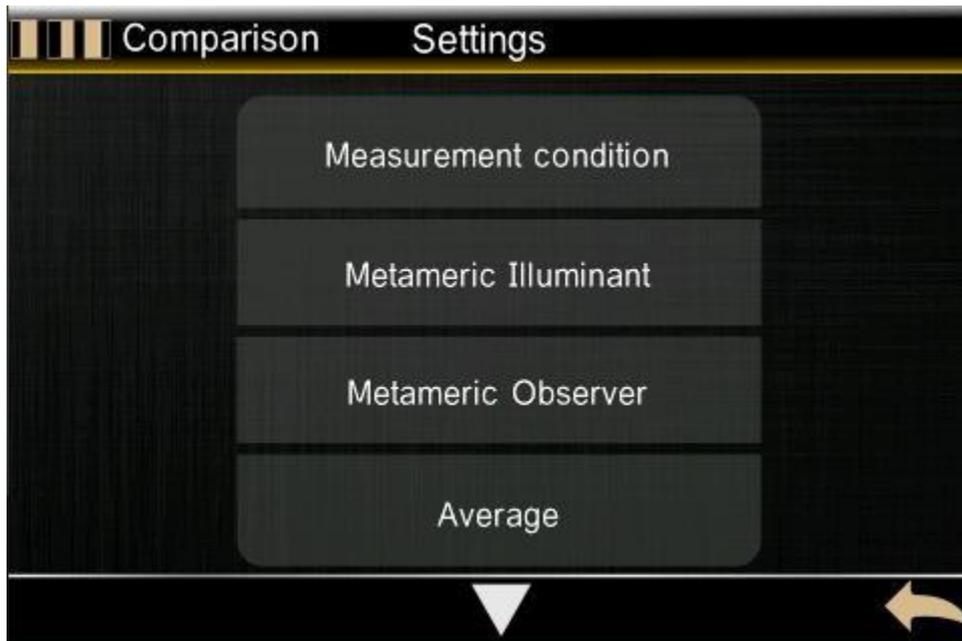
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6 System Settings

System settings mainly include setting and calibrating two functional modules.

6.1 Setting

Set to the instrument settings here, including **language settings, time settings, Bluetooth (some models are available), buzzer, calibration expiration date, factory reset, screen sleep, screen brightness, operating habits, and instrument selection.**

1. **Language setting**: Select "Language Setting" to enter the language setting interface. Users can select the display language according to their needs, and set the instrument language to any of English, Simplified Chinese and Traditional Chinese.

2. **Time setting**: Select "Time Setting" to enter the time setting interface. The user selects the

object to be set according to the need, then touch " ✔ " to enter the corresponding setting interface. If you do not want to set the modification time, date, format, touch " ⬋ " to return to the instrument setting interface.

3. **Bluetooth (some models have)**: Set the Bluetooth function by selecting Off or On.

4. **Buzzer**: Also set the buzzer function by selecting to turn off or on.

5. **Calibration Validity Period**: Select "Calibration Validity Period" to enter the calibration validity period setting interface, including three options: power-on calibration, 12 hours, and 24 hours. Users can select setting options as needed.

6. **Restore factory settings**: Select "Restore Factory Settings" to enter the factory reset interface, confirm this function and then touch " ✔ " to restore the instrument to the factory state.

7. **Screen sleep**: Select "Screen Sleep" to enter the screen backlight time setting interface, including five options: normally open, 5 minutes, 60 seconds, 30 seconds and 15 seconds. The user can select the setting options as needed. The instrument will automatically shut down after 5 minutes of operation.

8. **Screen brightness**: Select "Screen Brightness" to enter the screen brightness

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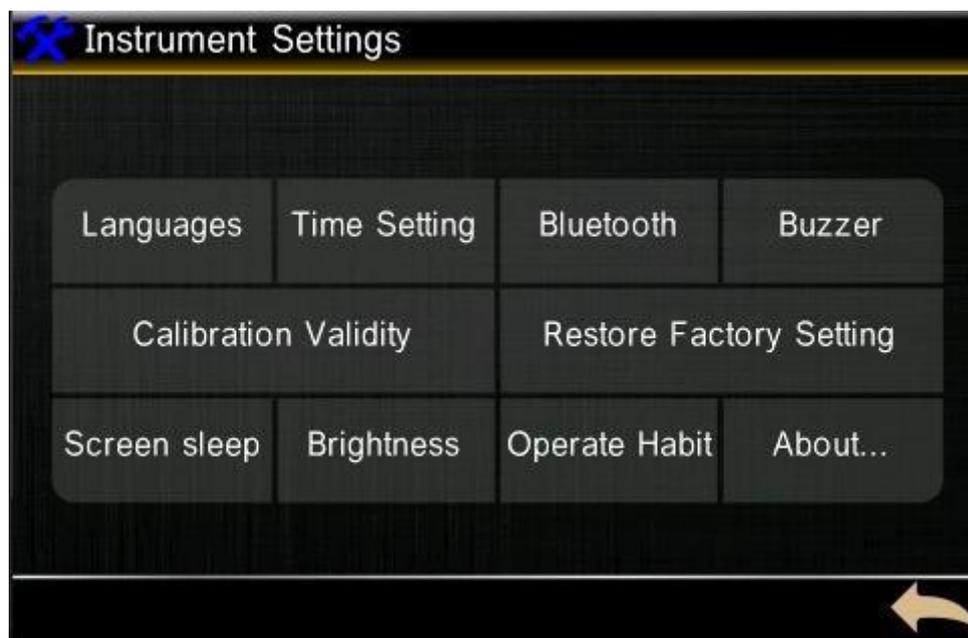Testing climate resistance to the limit

setting interface, and lower or increase the screen brightness by tapping "▬" or

"➕". The user can adjust

according to the actual situation. After the adjustment is completed, touch "✓"
to save the settings, and click "←" to cancel the save.

9.**Operating habits**: Users can choose the right or left hand to operate the instrument according to their own operating habits.

About the instrument: Select "About the instrument", enter the instrument interface, to view the relevant information of the instrument, including product model, software and hardware version information, etc.

Figure 53 Instrument Settings Screen

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This instrument is equipped with a calibration box and requires calibration before measurement. Enter the calibration interface from the system settings in the main menu. For detailed calibration steps, refer to section 3.6.

7 Daily Maintenance

1. This instrument is a precision optical instrument. Please keep and use the instrument properly. Avoid using and storing the instrument under humid, strong electromagnetic interference, strong light and dust. It is recommended to use and store the instrument in a standard laboratory environment (temperature 20 degrees Celsius, 1 standard atmosphere, humidity 50~70% RH.

2, the whiteboard is a precision optical component, it should be properly kept and used, avoid rubbing the working surface with sharp objects, avoid staining the working surface with dirt, and avoid exposing the whiteboard under strong light. Regularly clean the whiteboard working surface with a cloth and alcohol. When cleaning, clean the dust on the whiteboard surface.

3. In order to ensure the validity of the test data, the colour meter instrument and the whiteboard are recommended to be tested by the manufacturer or a qualified metrology institute for one year from the date of purchase.

4. This instrument supplies power to the external power adapter. The power supply should be used in a standard manner to avoid frequent plugging and unplugging of the power supply, to protect the power supply performance and to extend the service life of the power supply.

5. Please do not disassemble the instrument. If there is any problem, please contact the relevant after-sales staff.

If you have any queries regarding your new equipment, or require any additional accessories or consumables, please contact info@ascottshop.com or telephone +44 (0)1827 318040. If you wish to contact us by post, our full mailing address is 6-8 Gerard, Tamworth, Staffordshire, B79 7UW

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